United States Patent [19]

Giusti et al.

[11] **Patent Number: 4,883,510**

[45] **Date of Patent: Nov. 28, 1989**

[54] **GAS INLET CONSTRUCTION FOR FABRIC FILTER DUST COLLECTIONS**

[76] Inventors: **Giambattista Giusti,** 50 The Fellsway; **Robert W. Duyckinck,** 187 Commonwealth Ave., both of New Providence, N.J. 07974

[21] Appl. No.: **155,446**

[22] Filed: **Feb. 12, 1988**

[51] **Int. Cl.⁴** **B01D 46/02**

[52] **U.S. Cl.** **55/326;** 55/334; 55/341.1; 55/418; 55/444; 55/525

[58] **Field of Search** 55/128, 129, 307, 308, 55/319, 326, 334, 341.1-341.7, 344, 418, 419, 437, 444, 525

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,792,075	5/1957	McBride et al.	55/525 X
2,989,145	6/1961	Goodloe	55/525 X
3,026,968	3/1962	Koskinen	55/525
3,125,427	3/1964	Smith et al.	55/525 X
3,185,181	5/1965	Demyan	55/418 X
3,246,455	4/1966	Boddy	55/319
3,353,340	11/1967	Carsey	55/334 X
3,378,994	4/1968	Farr	55/484 X
3,425,189	2/1969	Haselmayer	55/418 X
3,739,557	6/1973	Anderson et al.	55/341.1 X
3,831,350	8/1974	Gilles et al.	55/418 X
3,831,354	8/1974	Bakke	55/418
3,912,634	10/1975	Howell	55/525 X
3,926,595	12/1975	Böckman	55/341.1 X
3,944,404	3/1976	Andrasfalvy	55/341.5 X
3,990,871	11/1976	Cooper	55/419 X
3,992,177	11/1976	Welteroth	55/326 X
4,105,724	8/1978	Talbot	55/525 X
4,158,554	6/1979	Bundy et al.	55/341.1 X
4,213,766	7/1980	Wyatt	55/129 X
4,219,343	8/1980	Peterson	55/341.4 X
4,227,903	10/1980	Gustavsson et al.	55/302
4,283,205	8/1981	Schumann	55/419 X
4,443,234	4/1984	Carlsson	55/334 X
4,544,383	10/1985	Haselmaker	55/418 X
4,655,804	4/1987	Kercheval et al.	55/341.1 X

FOREIGN PATENT DOCUMENTS

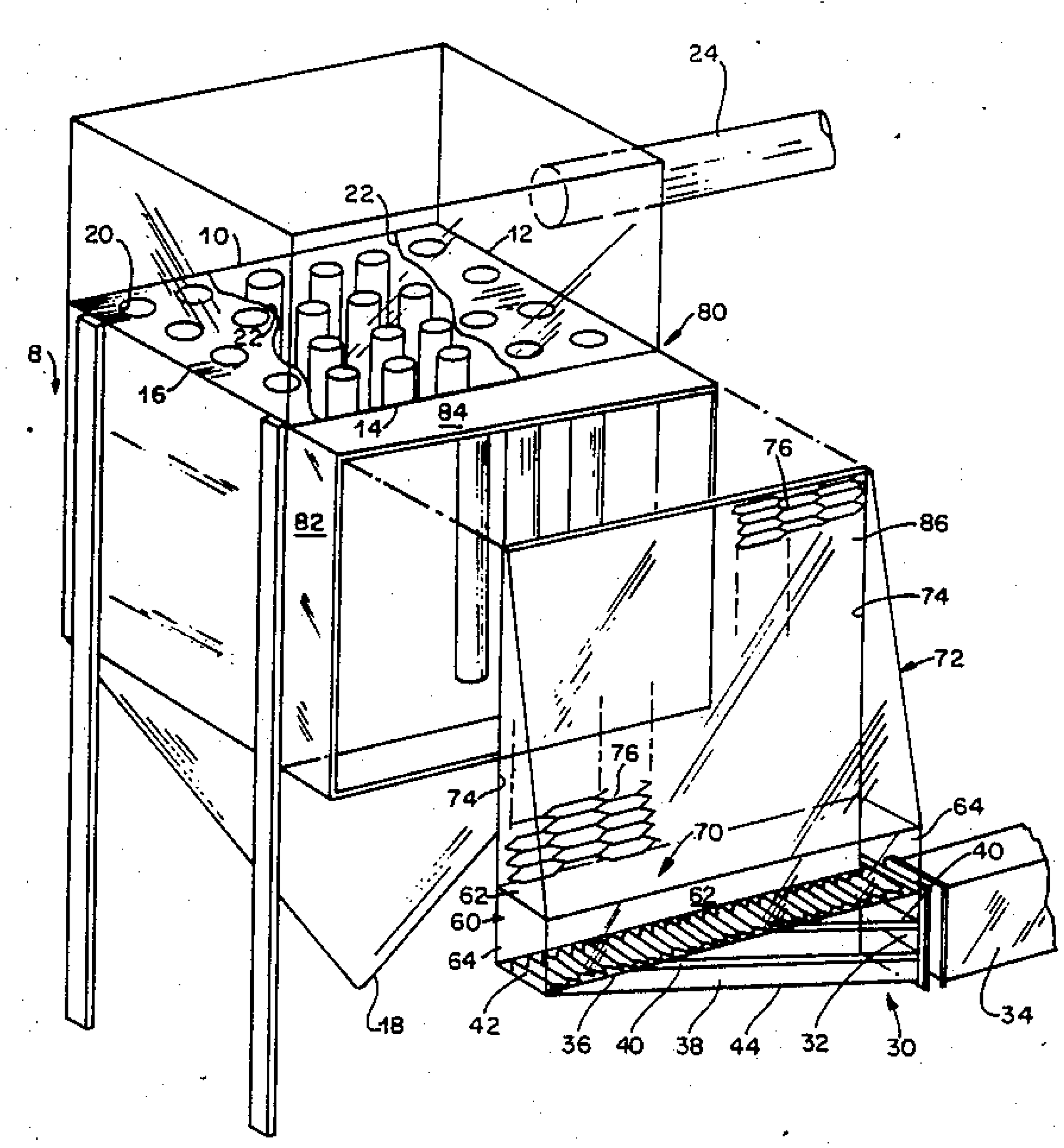
865339	9/1981	U.S.S.R.	55/341.1
922730	4/1963	United Kingdom	55/128

Primary Examiner—Robert Spitzer

[57] **ABSTRACT**

An improved gas stream inlet construction for industrial dust collecting apparatus such as fabric type gas filters that includes at least one velocity reducing transition section employing a selectively positioned expanded metal grid as a flow diverting and gas stream diffusing device located at the exit port thereof.

12 Claims, 6 Drawing Sheets



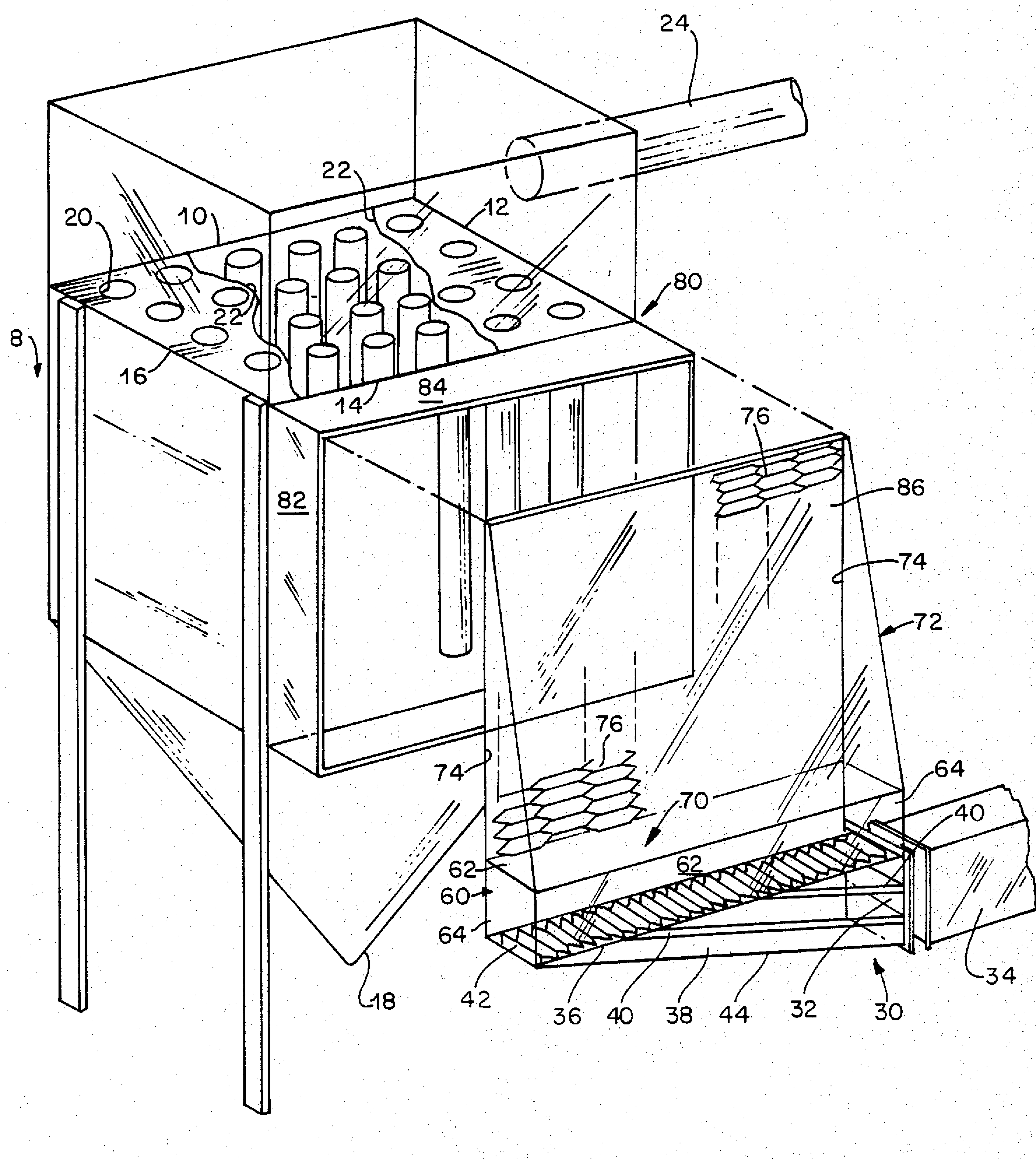

24
22
20
10
12
80
8
22
16
14
84
76
86
82
74
72
76
74
64
40
70
62
62
60
64
42
18
36
40
38
44
32
30
34

FIG. 1

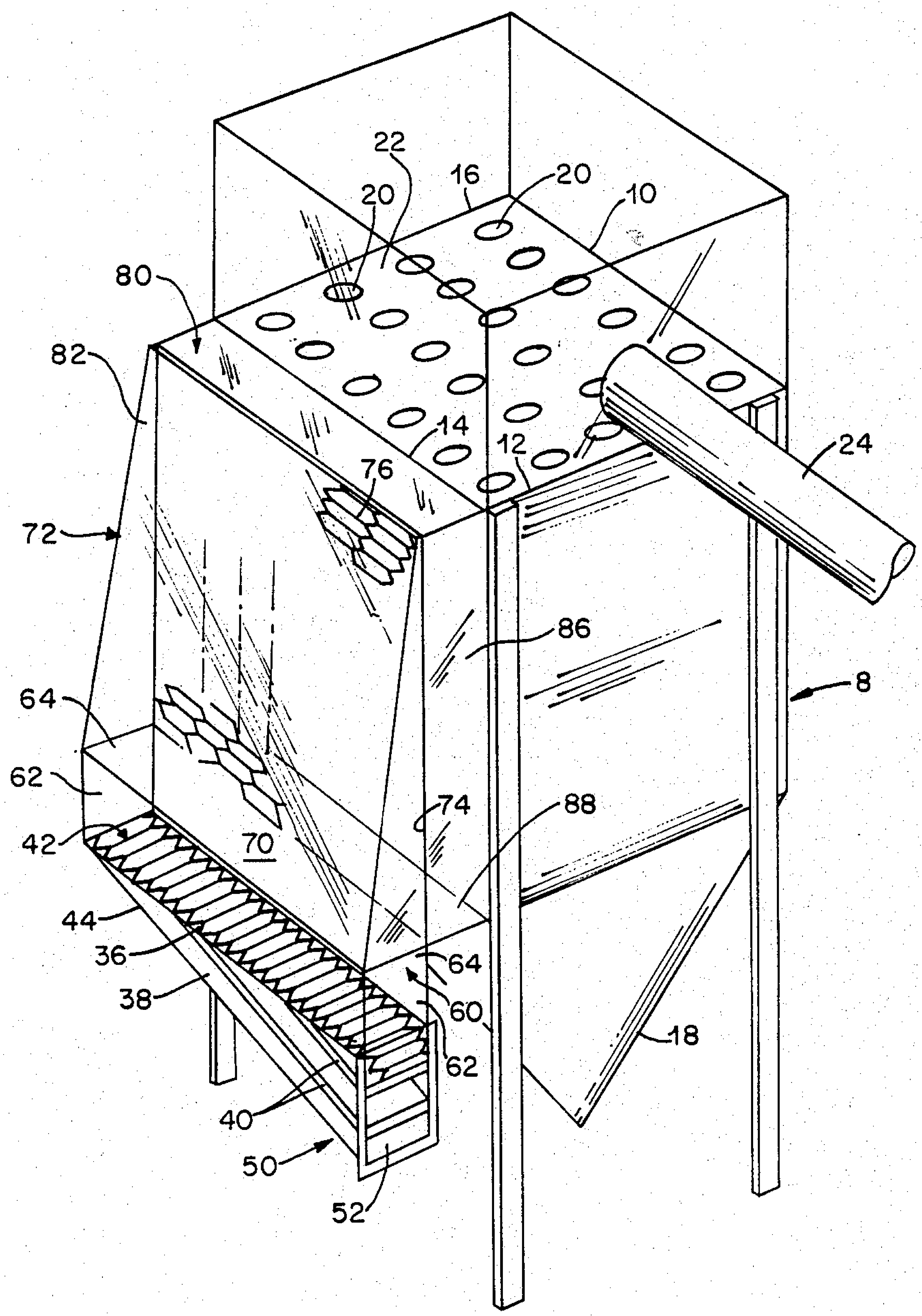

22
16
20
20
10
80
82
14
12
76
24
72
86
8
64
62
74
88
42
70
44
36
64
38
60
18
62
40
50
52

FIG. 2

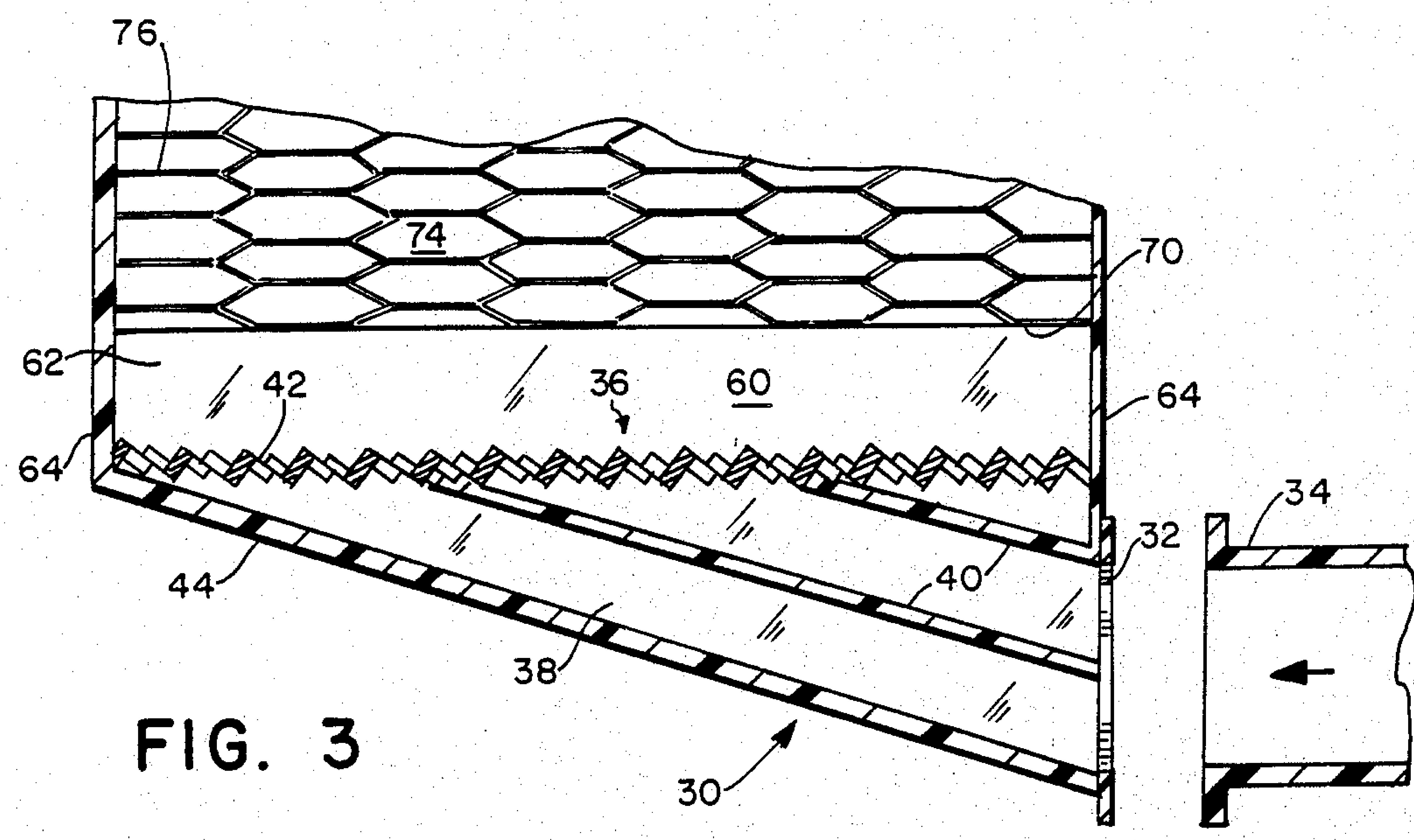


FIG. 3

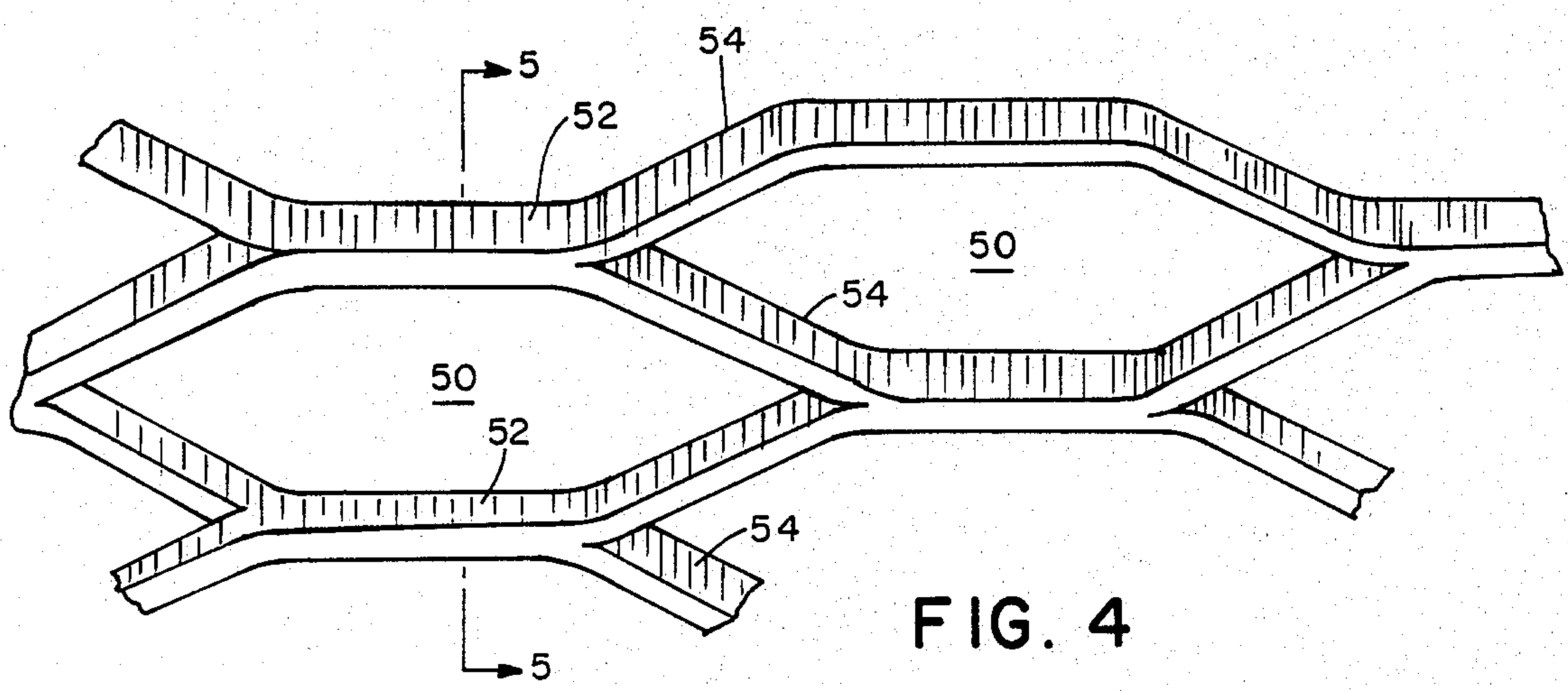


FIG. 4

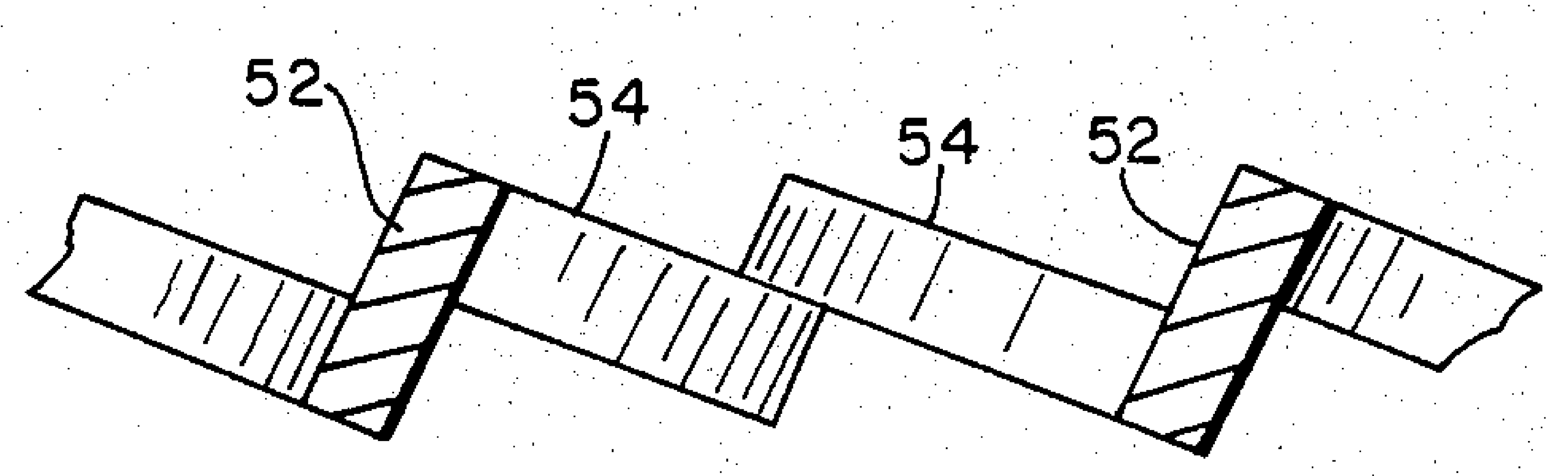


FIG. 5

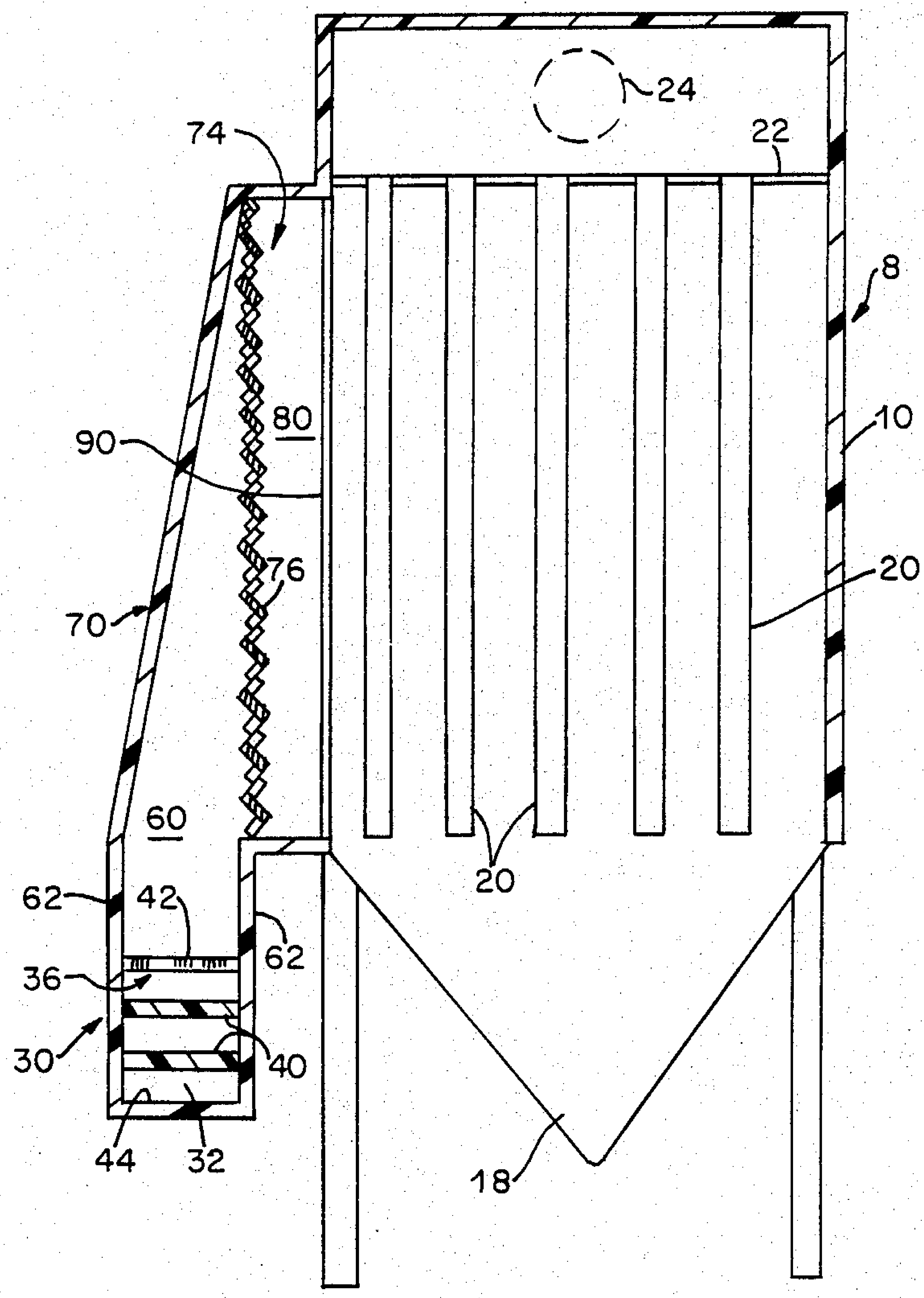


FIG. 6

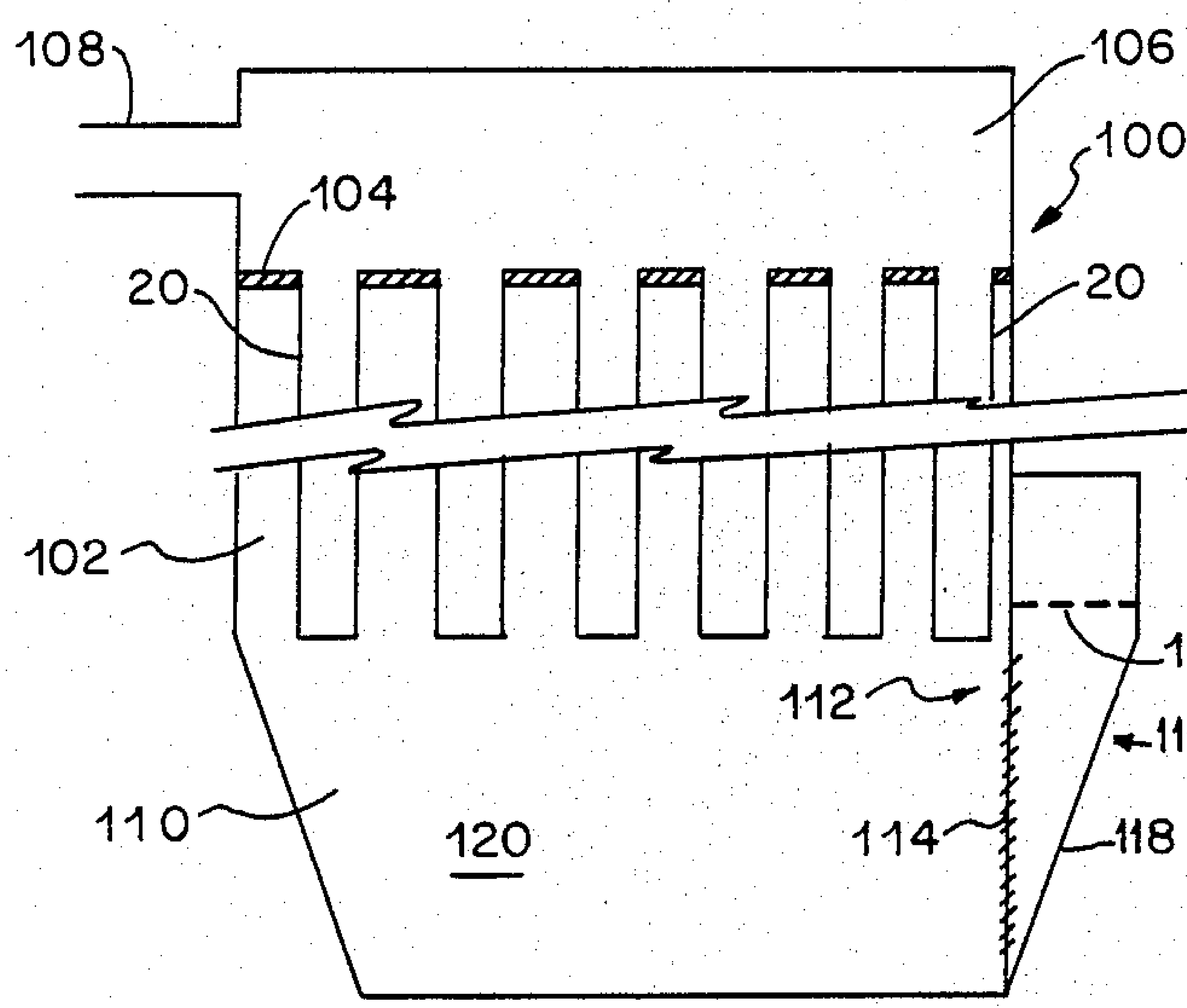


FIG. 9A

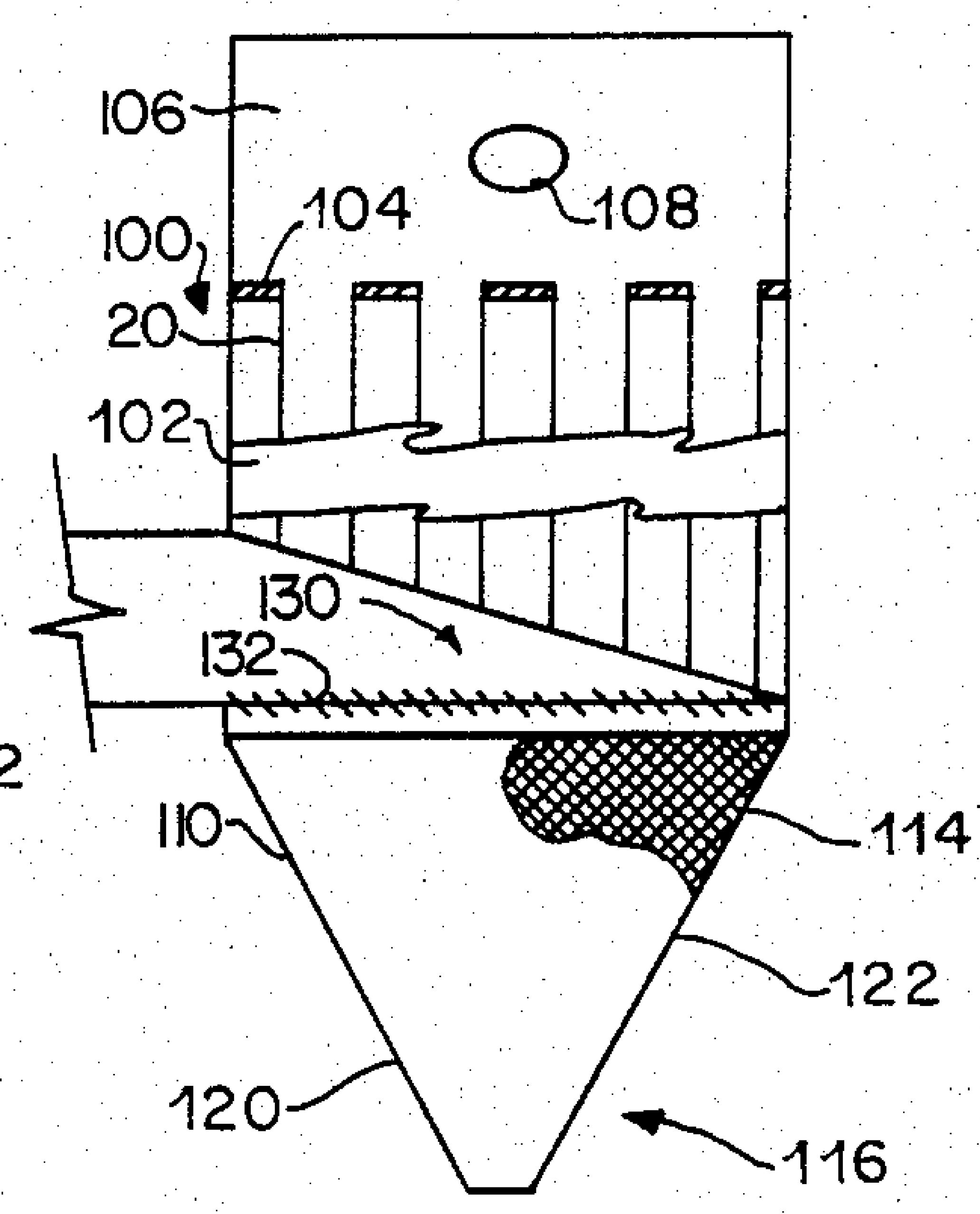


FIG. 9B

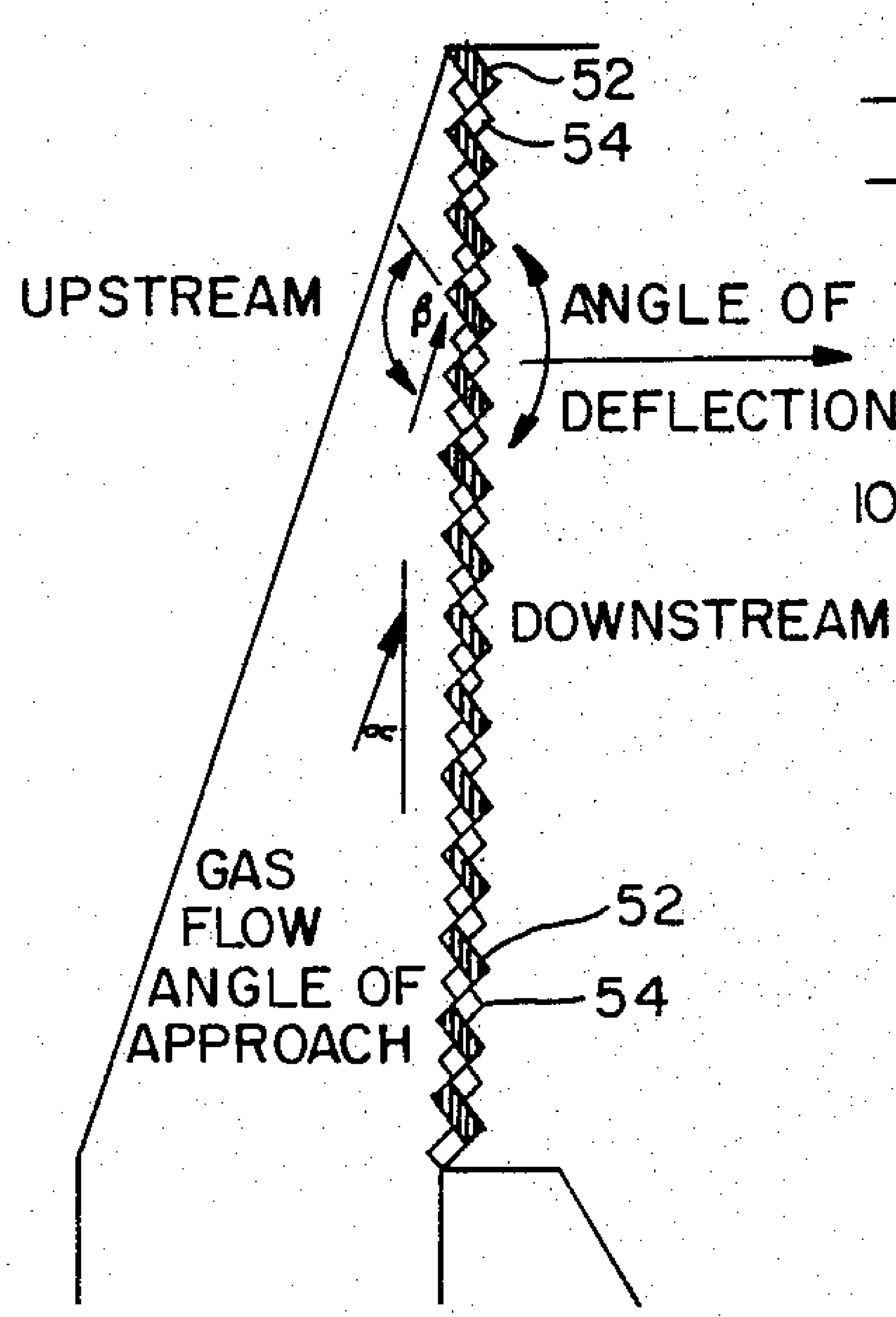


FIG. 7

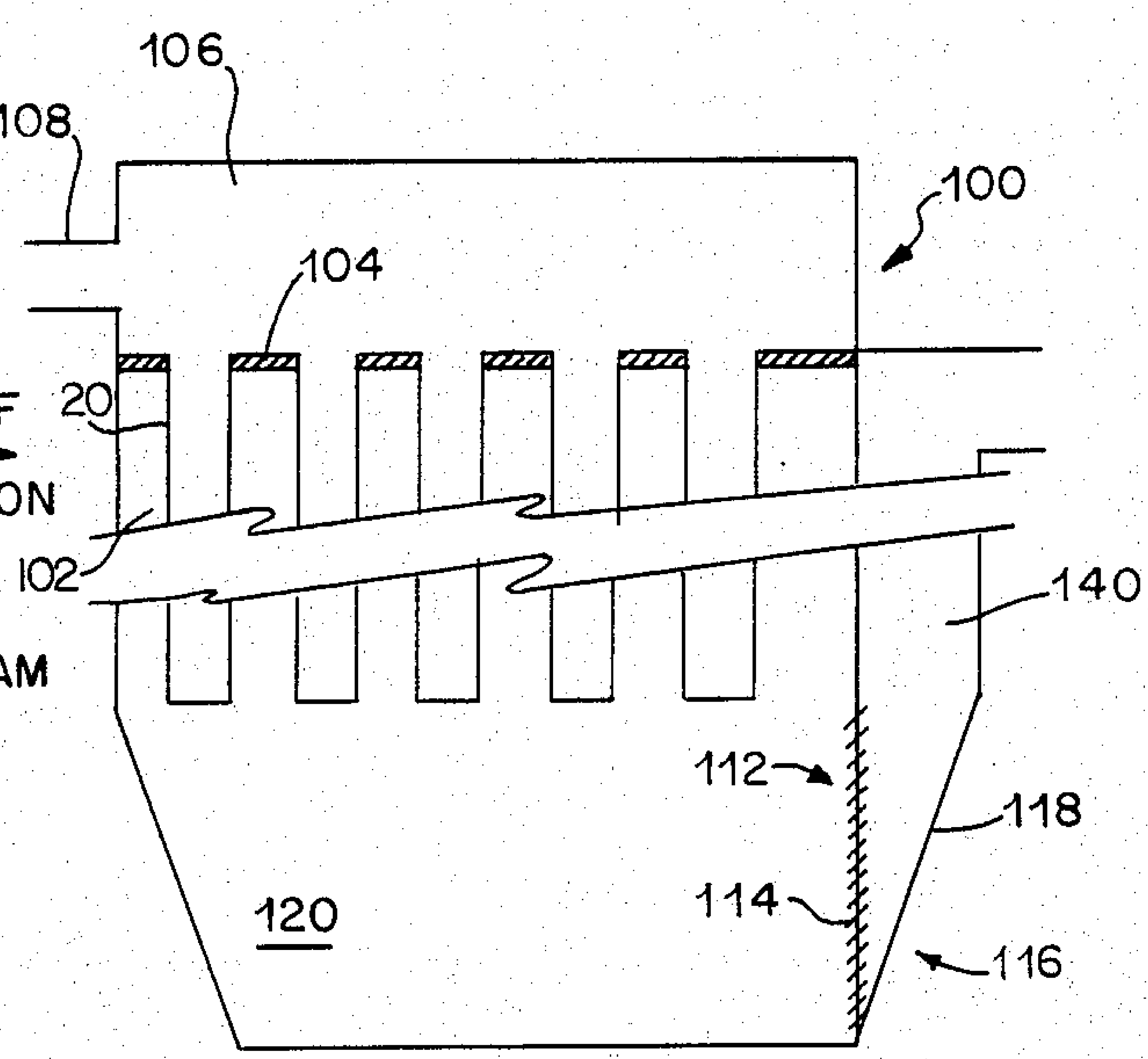


FIG. 9C

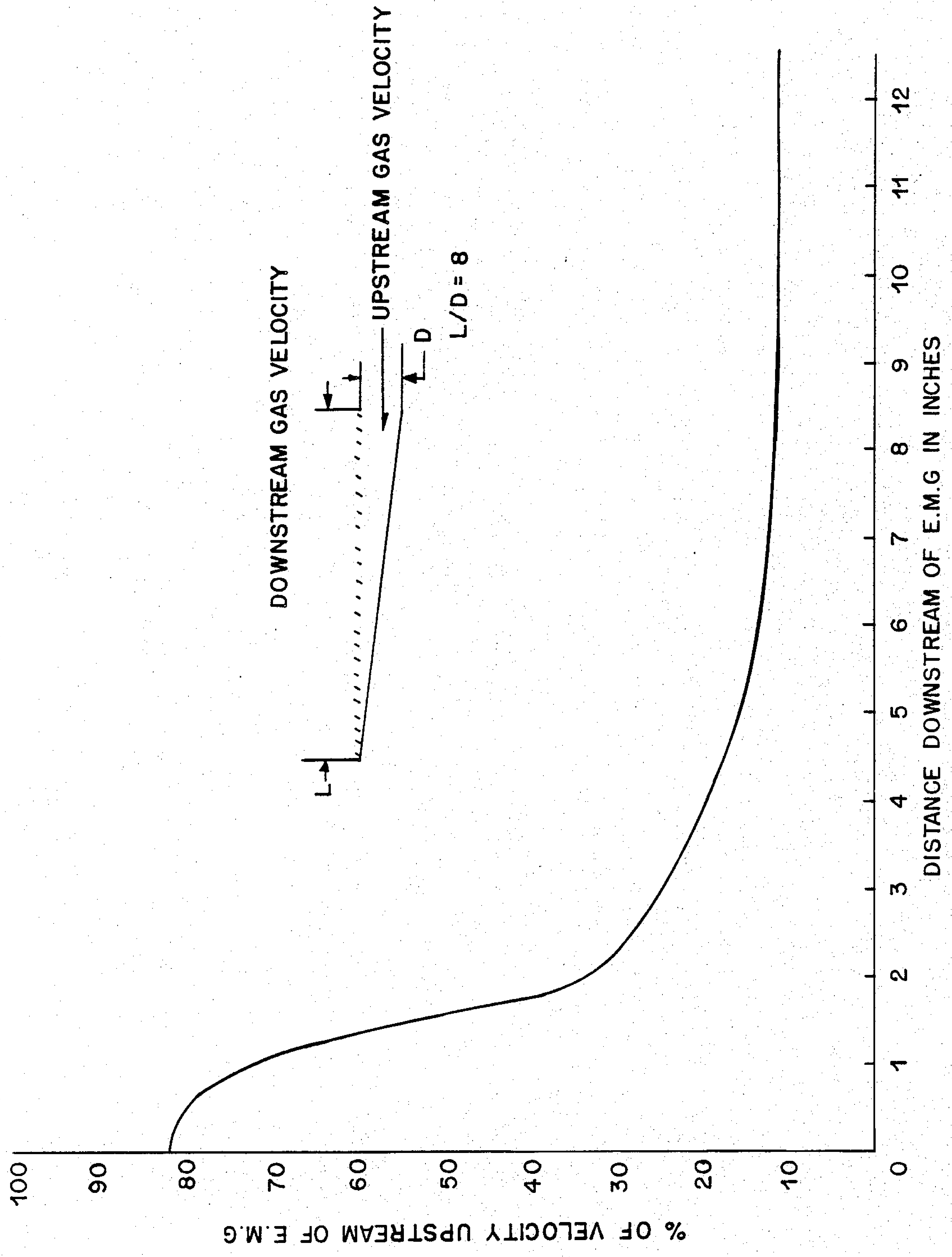

DOWNSTREAM GAS VELOCITY
UPSTREAM GAS VELOCITY
L
D
L/D = 8
% OF VELOCITY UPSTREAM OF E.M.G
DISTANCE DOWNSTREAM OF E.M.G IN INCHES
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
12

FIG. 8

GAS INLET CONSTRUCTION FOR FABRIC FILTER DUST COLLECTIONS

This invention relates to gas inlet system constructions gas treating apparatus and more particularly to apparatus for the controlled introduction and distribution of particulate laden gas streams into industrial fabric filter dust collectors.

BACKGROUND OF THE INVENTION

It has long been recognized that a controlled pattern of equable distribution and a control of velocity of a gas stream at the locus of introduction thereof into gas treating apparatus can materially contribute to increased efficiency of operation and extended operating life of the gas treating components thereof. One area of preferential concern has been in the industrial gas filtration field, and particularly in the fabric filter dust collector field. One type of such fabric filter dust collector, also called a "baghouse", typically employs a large number of tubular fabric filters suspended from a tube sheet and interposed in the path of a particulate laden gas stream to effect the separation of the particulate matter from the gaseous carrier as the latter traverses the fabric filter media in its passage from the dirty air plenum to the clean air plenum portion of the filter housing. Another type of fabric filter dust collector employs filter media in the form of flat panels rather than tubular filter bags. In both such types of dust collector, a particulate laden gas stream conventionally enters the filter housing either through a breach in a portion of the lower housing wall defining a dust collecting hopper and generally changes direction and flows upwardly toward the filter media or enters the housing through an upper sidewall portion of the collector housing defining at least a portion of the perimeter of the dirty air plenum. The particulate matter borne by the incoming gas stream normally accumulates on the upstream filter medium surface and, unless removed by dislodgement, results in a progressive increase in pressure drop across the filter media and in a concommitant reduction in the rate of gas flow through the filter media. In order to avoid excessive particulate accumulation on the upstream surface of the filter media, the filter media is periodically cleaned by utilization of various known techniques, such as pulse jet and reverse flow cleaning and bag shaking. The outcome of such cleaning operation is that a large part of the accummulated particulates are induced to drop off the filter media surface and fall downwardly, under the influence of gravity, toward and into a collection hopper.

In most industrial fabric filter installations of the type described above, the particulate bearing gas stream approaches the filter through a delivery or conveying conduit having a crosssectional area sized to effect gas stream displacement at sufficiently high velocities, usually in the order of 3500–4000 feet/min., to assure maintaining the particulate matter in suspended entrained condition therein. Antithetically thereto, it has been recognized that high efficiency - low loss filter operation and increased operating life of the filter components is dependent, at least in substantial part, by an equable distribution of deposited particulates on all the available filter media surfaces; by minimization, if not avoidance, of turbulence in gas flow within the dirty air plenum; by minimization of particulate re-entrainment

during or after filter media cleaning and by minimization of localized wear and abrasion of filter components. As is apparent, the high velocity attended operating parameters of the conduit confined approaching particulate bearing gas stream are basically antithetical to the desired optimum parameters of gas stream displacement within the filter housing and the attempted conversion thereof, normally within localized dimensional restraints, conventionally employs transition ducting and the interposition of turning vanes, baffle plates and related gas flow direction and velocity modifiers to the end of hopefully effecting a more equable distribution of the incoming particulate bearing gas stream relative to the available filter media surface and a marked reduction in its approach velocity.

The transition of the shape and velocity of the incoming particulate bearing gas stream to the desirable flow conditions within the fabric filter media housing has been a long standing problem in this art. Many expedients, such as expansion of conduit dimension and the use of baffle plates, turning vanes, flow dividers, perforated plate diffusers, gratings, grids, various types of deflector or distribution plates and the selective location thereof in the path of the incoming gas stream and the like have been suggested to enhance performance in the separation and collection of industrial dusts. Illustrative of some of such varied expedients are U.S. Pat. Nos. 4,227,903; 4,544,383; 4,655,804; 4,213,766; 3,926,595; 3,831,354; 3,831,350; 3,831,854; 3,739,557 and 3,425,189. While most of such expedients have resulted in some degree of improved performance, the net results have fallen far short of optimum and the problem of achieving high efficiency and economic operation of industrial fabric filter dust collectors remains a continuing one.

SUMMARY OF THE INVENTION

This invention may be briefly described as an improved inlet construction for industrial fabric filter dust collectors having an operative particle separation zone of predetermined perimetric height, width and depth located within a gas impervious housing and which includes, in its broader aspects, the employment of at least one velocity reducing transition section having an exit port which may be of perimetric contour sized and shaped to substantially conform to the height and width and perimetric contour of said particle separation zone and disposed in spaced fluid communicating relation thereto with said exit port being traversed by a selectively positioned expanded metal grid means. In such broader aspect, the invention further includes provision of means to equably distribute the gas stream over the upstream surface of said expanded metal grid means and to control the angle of gas stream approach thereto in connection with provision of a turbulent flow reduction zone disposed immediately downstream of the expanded metal grid means and intermediate said grid means and the particle separation zone to permit dissipation of localized turbulence induced by passage of the gas stream through the expanded metal grid means.

Among the advantages of the subject invention is the provision of improved operation of gas treating apparatus, and particularly for industrial fabric filter dust collectors, characterized by improved degrees of equable distribution of the particulate laden gas stream relative to the available filter media surface, an improved uniformity of dust loading of the filter elements, higher separation and collection efficiencies, reduced losses and increased service life of filter components.

The primary object of this invention is the provision of an improved gas stream inlet construction for gas treating apparatus such as industrial fabric filter type dust collectors.

Other objects and advantages of the subject invention will become apparent from the following portions of this specification and from the appended drawings which illustrate, in accord with the mandate of the patent statutes, presently preferred constructions of industrial fabric filter gas inlet systems incorporating the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic oblique view of components of a conventional fabric filter type of dust collector employing elongate tubular filter bags in association with an exploded view of an improved gas stream inlet assembly embodying the principles of this invention;

FIG. 2 is a second schematic oblique view of the assemblage of FIG. 1 as viewed from a different direction;

FIG. 3 is an expanded side elevation, partially in section, of a preferred construction for the first velocity reducing transition section incorporated in the assemblage shown in FIGS. 1 and 2;

FIG. 4 is an enlarged scale plan view of suitable expanded metal grid material employable in the practice of this invention;

FIG. 5 is a section as taken on the line 5—5 of FIG. 4;

FIG. 6 is a side elevation, partially in section, of the second velocity reducing transition section incorporated in the assembly shown in FIGS. 1 and 2;

FIG. 7 is a schematic representation of controlled gas stream approach to a selectively positioned expanded metal grid and effective diversion thereof;

FIG. 8 is a plot of observed data illustrating drop in gas velocity and reduction in turbulence on the downstream side of an expanded metal grid;

FIGS. 9A and 9B are schematic front and side elevational representations, partially in section, of a dust collector having a hopper entry gas inlet construction incorporating the principles of this invention; and

FIG. 9C is a schematic front elevational representation, partially in section, of a dust collector as shown in FIG. 9A, absent an introductory transition section.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings and initially to FIGS. 1 and 2 there is schematically depicted, by way of illustrative example, certain components of a conventional industrial fabric filter dust collector, such as a MikroPulsaire collector as manufactured by the MikroPul Corporation of Summit, N.J. As there depicted, such a device conventionally includes a rectangular gas impervious housing, generally designated 8, made up of side panels 10, 12, 14 and 16 and dependently terminating in a pyramidal dust collecting hopper 18. Positioned within the housing 8 are a plurality of elongate vertically disposed fabric filter bags 20, conventionally suspended from a tube sheet 22 in uniform spaced relation from each other. Conventionally, the contained volume disposed beneath the tube sheet 22 and externally of the filter tubes 20 is broadly delineated as a "dirty gas plenum". Similarly, the contained volume located above the tube sheet 22 is broadly delineated as a "filtered" or "clean gas plenum", and such is normally vented through a clean gas delivery conduit 24.

In normal filtering operations, a particulate laden gas stream being conveyed at high velocity to the dust collector is commonly introduced into the dirty air plenum through a restricted opening or breach in the wall of the dust collecting hopper 18. Once inside the dirty air plenum the velocity is reduced and such gas is induced to flow upwardly toward and through the filter media 20 and into the clean gas plenum, usually by action of a fan or other prime movant located downstream of the delivery conduit 24. As previously noted and depicted in the above listed patents, turning vanes, baffle plates and other gas flow modifiers are often placed on the path of the incoming gas stream in the hopper 18 in an effort to reduce the gas velocity and to equably distribute the gas over the available fabric filter media surface. As the gas passes through the filter media 20 the particulates entrained therein are separated and accumulate on the upstream (here the external) surfaces of such media. As also previously pointed out, such accumulated particulates are conventionally removed by a cleaning operation such as pulse jet cleaning, reverse flow cleaning or by shaking. The particulates dislodged by the cleaning operation fall, under the influence of gravity and usually countercurrent to the direction of gas flow and normally with undesired amounts of re-entrainment thereof, into the dust collection hopper 18.

The improved gas inlet system incorporating the principles of the invention essentially includes a velocity reducing transition section having an entry port sized and shaped to receive a high velocity particulate laden gas stream of specific predetermined cross-sectional dimensions, an exit port of greatly enlarged cross-sectional diameter disposed in direct fluid communication with the dirty air plenum portion of the dust collector housing and an expanded metal grid whose angled strands act as a multiple series of turning vanes to directionally divert and equably distribute the portions of the gas flow in a predetermined direction and at reduced velocity toward a particle separation zone that includes the filter media. Often times such velocity reducing transition section will be preceded by another velocity reducing transition section to effect a preliminary reduction in the velocity of the incoming gas stream from its conveying speed to an intermediate value. For convenience, such a two stage system will be hereinafter described as exemplary of a construction that includes one embodiment of an inlet system that incorporates the Principles of this invention.

In order to provide an improved equable distribution, non-turbulent and reduced velocity gas flow to the totality of available filter media surface, an improved gas inlet system incorporating the principles of this invention may include an introductory velocity reducing transition section, generally designated 30, having an entry port 32 sized and shaped to receive a high velocity particulate laden gas stream of a first predetermined cross-sectional area as determined by the dimensions and shape of a conveying duct 34. Conventionally such incoming "dirty" gas stream is conveyed at velocities of about 3500 to 4000 feet per minute to assure maintainence of particulate entrainment and to thereby effectively preclude particle separation in the conveying system. Disposed at right angles to the entry port 32 is an exit port 36 of a second and appreciably larger cross-sectional area. In the illustrated embodiment, the width of the entry port **32** and exit port **36** are the same and the increase in exit port area is obtained by markedly increasing the length thereof. Equable gas flow from the entry port **32** toward the full extant of the exit port **36** is directed by a tapering duct section **38**, and, if needed for improved equable flow distribution approaching the exit port **36**, by one or more flow separating and channeling partitions **40**. Disposed within and traversing the full extent of the exit port **36** is a selectively positioned expanded metal grid **42** whose angled strands act as a multiple series of turning vanes to turn or divert and equably distribute the portions of the incoming gas flow upwardly through the exit port **36**.

As shown in FIGS. **4** and **5**, the expanded metal grid is a commercially available fabricated product that results from the selective deformation, as effected by either punching or by slitting and drawing, of a flat sheet of metal to form a series of elongated but regular diamond, or preferably hexagonal, shaped openings **50** therein. The metal displaced by the deformation process forms a three dimensional border surrounding each opening **50** and this bordering metal includes a portion in the form of double width angled strands **52** which are disposed at an angle to the base sheets original planar dimension and determine the effective overall thickness of the deformed product and adjacent angularly skewed single width strands **54**.

As indicated above, the expanded metal grid is a commercially available fabricated product, conventionally used as flooring for runways, catwalks, platforms, stair treads and like purposes. Suitable expanded metal grid material can be obtained as RYEX Expanded Metal Grating from the Ryerson Division of Inland Steel Corporation and from McNichols Co. of Tampa, Fla. As identified in the literature of the above fabricators, the type of expanded metal grid that is of utility in the performance of this invention is identified as the "standard" version of expanded metal grid material wherein the strands are angularly offset. While such "standard" version of expanded metal grid material is available with either diamond shaped or hexagonal shaped openings **50**, the hexagonal opening shaped material has proved more effective in the diversion of gas flow and is preferred. Available evidence to date indicates that the diamond shape is only about 70% as effective as the hexagonal shape for diverting gas flow.

Carbon steel grades of domestically available expanded metal grid material are apparently produced as 1.2, 2.5, 3.0, 3.14, 4.0, 4.25, 5, 6.25 and 7 pounds per square foot grades. Of these hexagonal opening material of the 3.0, 4.0, 5.0, 6.25 and 7.0 pound per square foot grades are the most useful. As will be apparent, it is the geometrical configuration of the expanded metal grid material that is a significant operating parameter and, as such, other material of metallic or non-metallic character and formed into a similar configuration could also be employed.

Efforts to date have indicated that the mere use of expanded metal will not, in and of itself, provide for improved filter performance. Other factors that must be observed include the selective positioning of the metal grid material, the control of the angle of approach of the gas stream to the face of the expanded metal grid, the equable distribution of the approaching gas stream over the full surface of the selectively positioned expanded metal grid and reducing the gas stream velocity to a degree desirable to decrease or minimize turbulence. Experiments have indicated that, as the bordering strands **52** and **54** defining the hexagonal openings in the expanded metal grid become wider and thicker, in accord with the weight of the product in pounds per square foot, and the openings **50** become smaller and the total free area of such openings decreases, the greater is the magnitude of the deflection of the gas stream. Thus it appears that for a given gas stream approach angle, the heavier grades of expanded metal will deflect the gas stream flow more than the lighter grades. FIG. **7** depicts the desired orientation of the expanded metal grid material relative to the approaching gas stream. It has been noted that the angle of gas stream deflection not only varies for the different grades of expanded metal but also with each grade as the approach angle is changed. In general an approach angle α of from 5 to about 30 is preferred. Stated otherwise, preferred orientation of the expanded metal grid is present when the angle of approach of the incoming gas stream is at least normal to or forms an obtuse angle B with the double width strand surface **52**.

Referring back to FIGS. **1** and **2** it will now be apparent that the converging character of the introductory transition section bottom wall **44** relative to the grid **42** and the resultant progressively decreasing cross-sectional area of the section in the direction of gas flow, together with the vanes **40**, are directed to providing an equable distribution of gas flow as it approaches the expanded metal grid **42** disposed in the exit port **36**. In association therewith, the markedly increased area of the exit port **36** as compared to the cross-sectional area of the entry port **32** functions to provide a marked reduction in gas velocity as it is diverted and passes upwardly through the exit port **36**.

The passage of the gas stream through, and diversion by, the expanded metal grid **42** will inherently produce some degree of localized turbulence in the form of eddy currents and vortices. In order to dissipate and effectively eliminate such localized turbulence, a turbulent flow reduction zone **60**, defined by the upstream surface of the grid **42** and gas impervious side walls **62** and end walls **64**, is located immediately downstream of the grid **42**. Such zone **60** is in the general nature of a close walled conduit of limited length and of a cross-sectional extant equal to that of the exit port **36**. Such zone **60** functions to permit dissipation of localized turbulence induced by the passage of the gas stream through the first expanded metal grid **42** and further reduction in velocity thereof.

Referring now to FIGS. **1**, **2**, **3** and **6**, the exit end of the turbulent flow reduction zone **60** serves as the entry port **70** of a primary velocity reducing transition section disposed in direct fluid communication with the filter media, generally designated **72**. The entry port **70** is suitably of a cross-sectional area generally equal to that of the exit port **36** of the introductory transition section **30**. Disposed at right angles to such entry port **70** is an exit port **74** of markedly greater cross-sectional area. Desirably, the exit port **74** of the primary transition section **72** is of a perimetric contour, here rectangular, sized to substantially conform to the height and width of the particle separation zone as the latter is defined by the overall height and width of the assemblage of filter bags **20** within the dirty gas plenum. As was the case with the introductory transition section **30**, the exit port **74** is traversed by a similar expanded metal grid **76**.

In order to effect an equable distribution of the particulate gas stream over the available area of the exit port **74** and at a proper angle of approach, as above described, to the expanded metal grid 76, the primary transition section 72 is also of tapering character and of progressively decreasing crosssectional area in the direction of gas flow. If desired, flow splitting channel members or vanes of the type shown and described in conjunction with the first transition section 30, may also be included in the primary transition section 72. The reduced velocity gas stream emanating from the introductory turbulent flow reduction zone 60 will be markedly further reduced in velocity and diverted at right angles as it passes through the expanded metal grid 76 to a direction effectively perpendicular to the surface of the filter bags 20 and equably distributed over an area substantially conforming both in shape and dimension to that of the particle separation zone. As will be apparent to those skilled in this art, local geometry conditions, such as the presence of obstructions, catwalks and the like, may function to limit the area of the exit port 74. Desirably however such exit port should be as large as possible with respect to the height and width of the particle separation zone.

Since the passage of the gas stream, albeit at reduced velocity, through the expanded metal grid 76 will be attended by localized turbulence adjacent the downstream surface thereof, a turbulence reduction zone 80, again in the general form of a short length closed conduit of a cross section generally conforming in size and shape to the exit port and formed by walls 82, 84, 86 and 88, is disposed immediately downstream of the grid 76 and intermediate said grid and the particle separation zone within the filter housing. The downstream end of the turbulence reduction zone 80 fluidly communicates with an opening 90 in the wall of the perimetric housing 8 again sized to substantially conform both in shape and dimension with the particle separation zone.

FIG. 8 illustrates the marked drop in localized gas stream velocity within the turbulence reduction zone and immediately downstream of the expanded metal grids.

In summary and as will now be apparent, the primary transition section 72 operates to direct the incoming high velocity gas stream through a right angle turn. As the gas flow enters the expanded metal grid, the grid functions to both divert, essentially at right angles, and in association with the adjacent turbulence reduction zone, to uniformly reduce the gas stream velocity. If equably distributed, the gas flow encountering the expanded metal grid will be expanded with a consequent velocity reduction and change of direction. The gas stream emanating from the grid and adjacent turbulence reduction zone may readily be of a perimetric contour, both as to shape and dimension, matching that of an opening 90 in the perimetric housing and of predetermined operative relation to the particle separation zone therewithin. With the herein disclosed primary transition section and expanded metal grid disposed in the exit port thereof, the velocity of the gas stream can readily be reduced and converted in form for a markedly improved equable distribution relative to the available filter media surfaces.

The above described embodiment of the improved inlet construction incorporating the principles of this invention desirably effects introduction of the dirty gas stream into the particle separation zone through a side wall of the perimetric housing of the dust collector and in a direction in alignment with and essentially perpendicular to the longitudinal center line of the tubular fabric filter media. The inlet construction as herein disclosed is also adaptable to dirty gas inlet through the collection hopper located below the filter media.

FIGS. 9A and 9B are schematically illustrative of a hopper gas entry system incorporating the principles of this invention. As there depicted the fabric filter dust collector 100 includes a dirty air plenum 102 separated by a tube sheet 104 from a clean gas plenum 106 vented by an exhaust duct 108. The dust collecting hopper 110, which is shown as being of elongate character, include an enlarged opening 112 at one end thereof traversed by an expanded metal grid 114 of the type described above and oriented relative to the approaching gas stream as heretofore disclosed. Here again the grid 114 traverses the exit port 112 of a transition section 116 defined by the conveying wall member 118. As best shown in FIG. 9B the transition section 116 also includes conveying hopper side walls 120 and 122.

Although not herein essential, the above described inlet construction desirably may include an introductory transition section 130 having an expanded metal grid 132 disposed in the exit Port thereof. FIG 9C is schematically illustrative of the dust collector depicted in FIGS. 9A and 9B without an introductory transition section. In this embodiment, the dirty gas stream is introduced into an enlarged conduit section 140 suitably disposed adjacent the side wall of the collector. Desirably the conduit section 140 may be of a cross-sectional area appreciably larger than that of the gas conveying duct so as to permit a decrease in gas velocity prior to engagement with the expanded metal grid 114.

In the operation of the above described device, the expanded initial grid 114 again functions to divert and diffuse the incoming dirty gas stream. After passage through the grid and the turbulence reduction zone located immediately downstream thereof, the gas stream is directed at further decreased velocity, into the hopper 120 in a direction substantially perpendicular to the longitudinal center line of the filter bags 20 but below the filter bags. Desirably such gas stream will flow across the hopper and will be upwardly diverted toward the particle separation zone, here defined by the overall breadth and depth of the filter bag assemblage, by the induction of the fan disposed downstream of the exhaust duct 108.

It will also be apparent to those skilled in the art that the converging character of the transition sections could be effected by having the solid base wall thereof disposed parallel to the direction of gas flow and by having the expanded metal grids disposed at an angle thereto and other than at right angles to the plane of the entry aperture.

Having thus described our invention; we claim:

1. In fabric filter dust collector apparatus for separating and collecting entrained particulate matter being conveyed in an incoming gas stream of a first predetermined cross-sectional area,

a multiplicity of vertically oriented elongate filter bags arranged in spaced parallel relation to each other and perimetrically defining a particle separation zone of predetermined height, width, and depth,

a gas impervious housing surrounding said particle separation zone including side walls and a dependent particle collecting hopper,

gas inlet means for equably distributing and introducing the incoming gas stream and entrained particulate matter at reduced velocity into said particle separation zone, said gas inlet means comprising, a velocity reducing transition section having an entry port of second predetermined cross-sectional area for reception of the incoming gas stream, an exit port of a third and markedly enlarged cross-sectional area disposed in spaced fluid communicating relation with said particle separation zone through a complementally contoured opening in said gas impervious housing to deliver the gas stream therefrom at reduced velocity and expanded metal grid means of overall planar character disposed in and traversing said exit port for equably distributing and diverting the incoming gas stream through at least a 90° change of direction for delivery toward said filter bags,

said expanded metal grid means having a plurality of polygonal openings therein each bounded by a three dimensional border of angularly offset strands, at least one strand of which is of a double width disposed in facing relation to the approaching gas stream.

2. Apparatus as set forth in claim 1 further including means defining a turbulent flow reduction zone immediately downstream of said expanded metal grid means and intermediate said grid means and said particle separation zone to permit dissipation of localized turbulence induced by passage of the gas stream through said expanded metal grid means.

3. Apparatus as set forth in claim 1 further including means for directing the incoming gas stream at an approach angle of about 5° to 30° to the overall plane of said expanded metal grid means.

4. Apparatus as set forth in claim 1 wherein said exit port is of a perimetric contour sized to conform to at least a substantial portion of the shape, height and width of the particle separation zone and fluidly communicates therewith through said opening in a side wall of said housing.

5. Apparatus as set forth in claim 1 wherein said exit port of said transition section and expanded metal grid means traversing the same delivers the gas stream into the dependent particle collecting hopper.

6. Apparatus as set forth in claim 5 wherein said expanded metal grid means delivers the incoming gas stream into said hopper in a direction substantially perpendicular to the longitudinal center line of said filter bags.

7. Apparatus as set forth in claim 5 wherein the last mentioned transition section comprises a primary transition section and further including an introductory velocity reducing transition section disposed intermediate said primary transition section and the incoming gas stream.

said introductory velocity reducing transition section having an entry port of substantially said first predetermined cross-sectional area for reception of the incoming gas stream, an exit port of fourth predetermined cross-sectional area greater than said first predetermined cross-sectional area to deliver the incoming gas stream therefrom at a reduced velocity to said primary transition section, said exit port of said introductory transition section having expanded metal grid means of generally planar character disposed thereacross, said grid having a plurality of polygonal openings therein each bounded by a three dimensional border of angularly offset strands, at least one strand of which is of a double width disposed in facing relation to the approaching gas stream for equably distributing and diverting said approaching gas stream through at least a 90° change of direction toward said primary transition section

8. Apparatus as set forth in claim 7 further including, means defining a turbulent flow reduction zone located immediately downstream of the expanded metal grid means disposed across the exit port of said introductory transition section to permit dissipation of localized turbulence induced by passage of said gas stream therethrough.

9. Apparatus as set forth in claim 7 wherein said entry and exit ports in said introductory velocity reducing transition sections are at right angles to each other.

10. Apparatus as set forth in claim 1 wherein said entry and exit ports in said velocity reducing transition section are at right angles to each other.

11. Apparatus as set forth in claim 1 wherein said polygonal openings in said expanded metal grid means are of rhomboid configuration.

12. Apparatus as set forth in claim 1 wherein said polygonal openings in said expanded metal grid means are of hexagonal configuration.

* * * * *